

PROJECT DATA			
Shivvers, Inc. - 01GO11037			
Development of an Energy-Saving Grain Drying Invention			
Recipient:	Shivvers Inc.	Instrument Number:	DE-FG36-01GO11037
Recipient Project Director:	Carl Shivvers 641.872.1005 614 W. English Corydon, IA 50060	CPS Number:	1592
Recipient Type:	For Profit Organization	HQ Program Manager:	Lisa Barnett 202.586.2212
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		B & R Number(s):	ED1906020
		PES Number(s):	01-2031
EERE Program:	Industrial Technologies	State Congressional District:	IA - 3
PROJECT SCOPE: This project will develop technologically advanced grain dryers that integrate multiple drying processes with multiple heat recovery and heat conservation technologies, while minimizing their known disadvantages. Most of the work is design oriented, and a full-scale engineering prototype will be constructed. Adoption of this technology for drying corn can save 375 million gallons of propane and avoid generation of 2,287,000 tons of CO ₂ /yr.			
FINANCIAL ASSISTANCE			
Approved DOE Budget	\$200,000	Approved DOE Share	\$200,000
Obligated DOE Funds	\$200,000	Cost Share	\$70,000
Remaining Obligation	\$0		
Unpaid Balance	\$72,000	TOTAL PROJECT	\$270,000
Project Period: 4/1/01-3/29/04			

TECHNICAL PERFORMANCE
DE-FG36-01GO11037
Shivvers, Inc.
Development of an Energy-Saving Grain Drying Invention

PROJECT SYNOPSIS

This project will develop a new class of technologically advanced grain dryers that integrate the known advantages of multiple drying processes with multiple heat recovery and heat conservation technologies, while minimizing their known disadvantages. A full-scale engineering prototype will be constructed. Most of the work is design oriented. Construction and testing of the prototype may take place at the commercial grain elevator located within the city limits of Corydon, IA. Computer models will be utilized for final process design and development of the control system followed by the mechanical design of an integrated grain drying technology. This will lead to a full-scale pre-production unit for final performance testing and commercial demonstration. Adoption of this technology for drying corn in the U.S. at 60% of corn dryer installations has the potential to save 375 million gallons of propane and avoid generation of 2,287,000 tons of CO₂/yr.

SUMMARY OF TECHNICAL PROGRESS

The final process design has been optimized. After considering various alternatives, Shivvers decided to operate the prototype with a combination of existing computerized controller and manual operation. All other work is in progress.

SUMMARY OF PLANNED WORK

Shivvers is actively engaged in the Prototype Mechanical Design task; Subsystem Testing, Design and Fabrication of Testing Equipment task; Fabrication, procurement, and assembly of prototype; and Installation of Prototype. These interrelate and intertwine with each other.

The project is scheduled to be completed within budget.

PROJECT ANALYSIS

The project is behind schedule. The grant expired on 3/29/04 and Shivvers has stated that a no-cost time extension request is on the way. It appears that they will need one additional year to complete the prototype construction and testing as well as the energy savings analysis.

ACTION REQUIRED BY DOE HEADQUARTERS

No action is required by DOE Headquarters at this time.

STATEMENT OF WORK

DE-FG36-01GO11037

Shivvers Inc.

Development of an Energy-Saving Grain Drying Invention

Detailed Task Description

Task 1. Design Optimization

Refine the overall conceptual and process design of the dryer to optimize dryer performance (energy efficiency, grain quality, and throughput capacity), manufacturing costs, site construction costs, and long-term operating costs. Activities for this task include: an iterative process of estimation of costs for a given process design coupled with computer performance simulation of that design; evaluation of cost and performance for multiple configurations; and select optimum design with significant weighting given to energy efficiency.

Task 4. Prototype Mechanical Design

Design the full-scale prototype based upon the selected optimum design. The primary result will be the creation of engineering drawings.

Task 5. Control Strategy Development

Formulate and develop the preferred control strategy. Activities to be completed include: description focusing on possible control strategy; computer simulation strategy for adequate and appropriate system response; and selecting the preferred control strategy.

Task 7. Control System Design

Design the computerized controls which will execute the strategy selected in Task 5. The result will be a set of computer instructions for a modified Shivvers Comp-U-Dry controller.

Task 8. Fabrication, Procurement, and Assembly of Prototype

Build and/or buy the various needed components of the prototype grain dryer and assemble the dryer. Task activities include: equipment and materials procurement; component fabrication; assembly of components at Shivvers' factory; and construction of dryer at testing time.

Task 11. Prototype Testing

Prepare for and test the performance of the dryer. Specifically, Shivvers will purchase and/or fabricate test monitoring equipment; and install test monitoring equipment. Additionally Shivvers will complete multiple runs of the dryer to accumulate data on the following: grain input and output moistures, capacities, grain quality and ambient air conditions; plenum air flow rate, temperature, and humidity; grain moisture and temperature at various points; and electric and propane consumption.

Task 12. Test Results Analysis

Analyze and interpret the data gathered in Task 8 by these activities: tabulation and/or graphing of data; comparison of actual dryer performance to computerized predictions; and conceptualization of further process improvements.

Task 14. Process and Design Improvement

Based upon knowledge gained from testing, improve the instrumentation and control or mechanical design to further enhance performance.

Task 15. Prototype Modification

Implement any improvements developed in Task 11. The results will be manifested in the prototype.

Task 18. Second Season Testing

Test the performance of the improved dryer and identify any problems that may need to be addressed before final introduction of the system into the marketplace. Preview the product for media and other invited guests. Testing will be similar to that of Task 8.

Task 19. ISU's Formal Paper

Prepare an article for publication in a reviewed journal documenting the dryer's innovations and performance.

Tasks 3, 10 & 17. Attend Annual Project Review

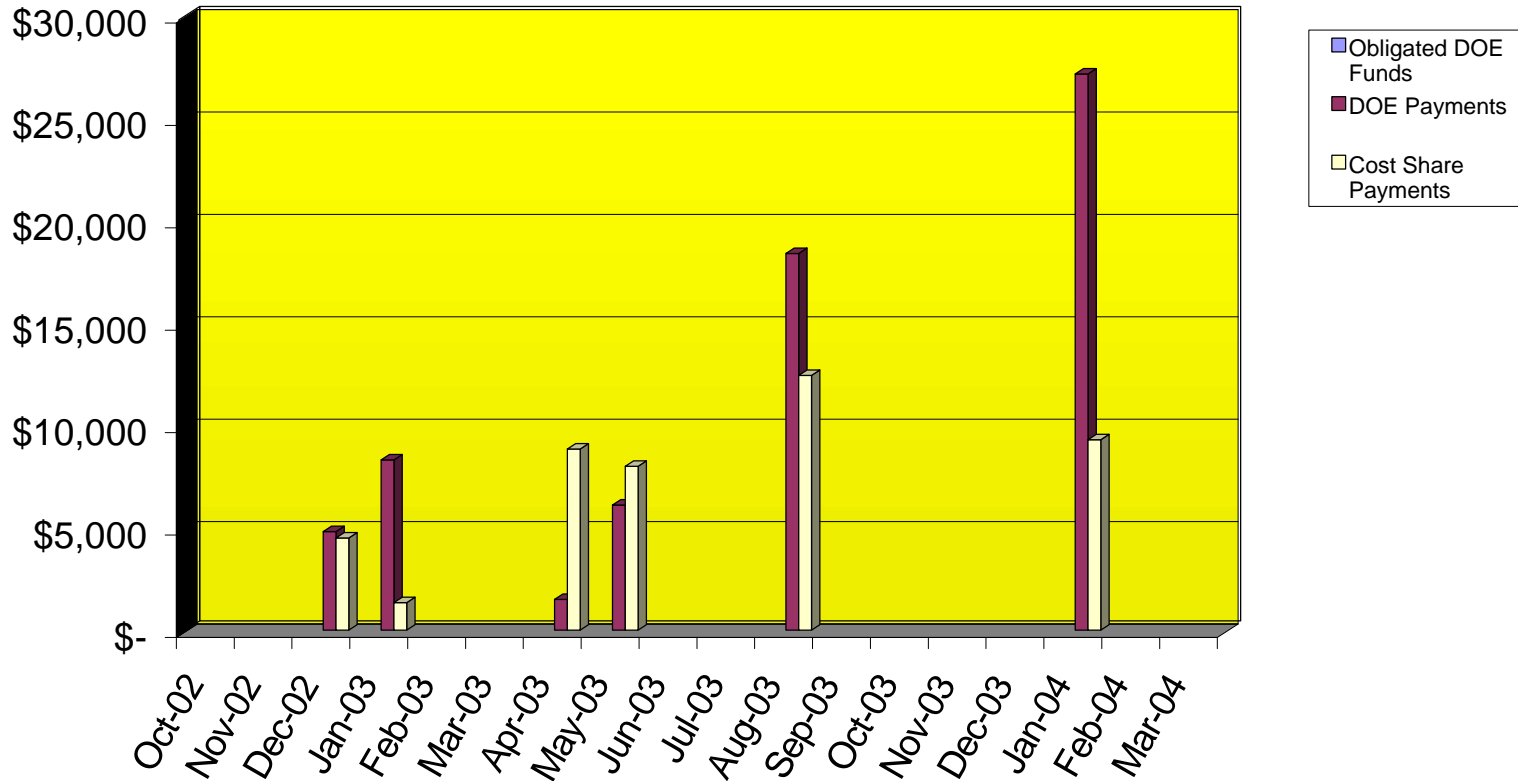
At the request of DOE, attend a project review and present project status and discuss upcoming goals and objectives.

Tasks 2, 6, 9, 13, 16 and 20. Project Management and Reporting

The purpose of this task is to provide overall project management and timely reporting and preparation of project results. This includes the supplemental "Cost/Administrative Information" that must be furnished to DOE within 30 days after notification of selection for negotiations and award, project and financial status reports, and the final project report due 90 days after completion of the project. This task also includes other DOE requirements for a market assessment, fact sheets, benefit analyses, market assessments, workshops, etc.

Project Cost Performance in DOE Dollars for Fiscal Year 2003

DE-FG36-01GO11037 Shivvers, Inc.
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	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Obligated DOE Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DOE Payment	\$0	\$0	\$4,825	\$8,325	\$0	\$0	\$1,500	\$6,111	\$0	\$0	\$18,401	\$0
Cost Share Payment	\$0	\$0	\$4,500	\$1,350	\$0	\$0	\$8,845	\$8,000	\$0	\$0	\$12,446	\$0

	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	PFY*	Cumulative
Obligated DOE Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$200,000	\$200,000
DOE Payment	\$0	\$0	\$0	\$27,170	\$0	\$0	\$61,741	\$128,073
Cost Share Payment	\$0	\$0	\$0	\$9,300	\$0	\$0	\$7,125	\$51,566

Approved DOE Budget:	\$200,000
Approved Cost Share Budget:	\$70,000
Total Project Budget:	\$270,000

* Prior Fiscal Years

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